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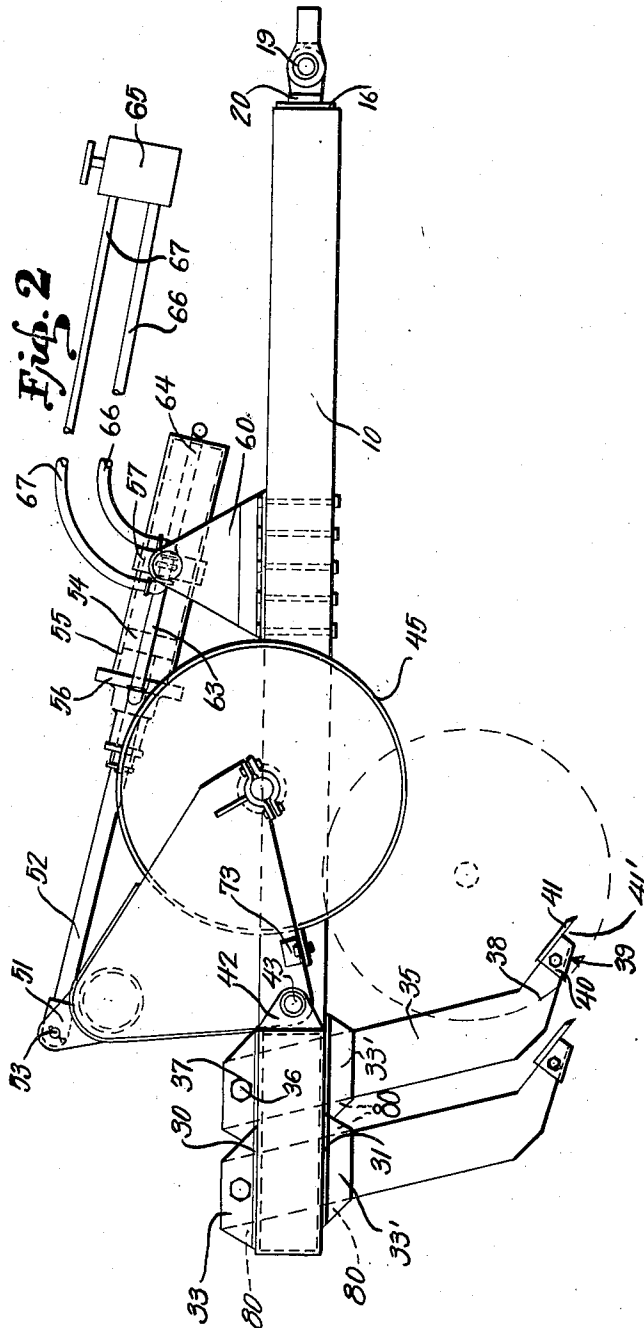
R. M. DAVENPORT

2,128,602

RIPPER

Original Filed April 2, 1935

3 Sheets-Sheet 2



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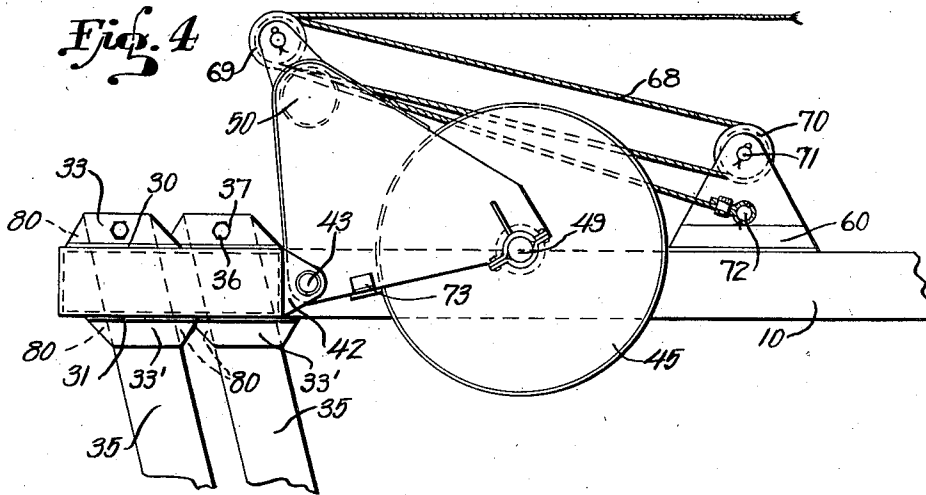
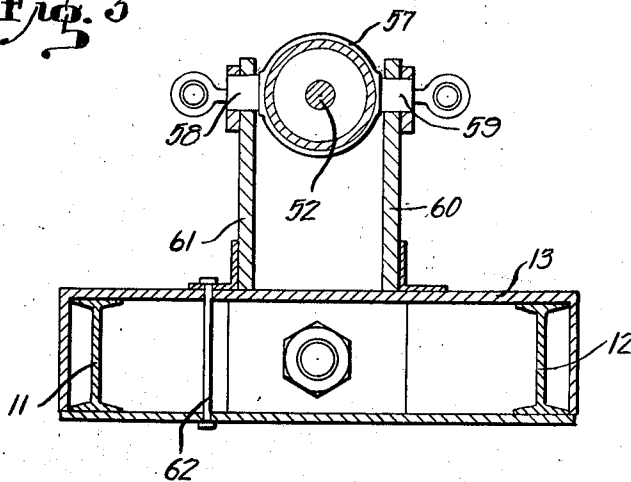


Fig. 3



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2 Claims. (Cl. 262—8)

This invention relates to a scarifier and particularly pertains to a hydraulic ripper.

In various operations where the earth, pavements, and other formations are to be scarified it is desirable to provide a scarifying structure which may be easily moved from place to place as drawn by traction means and which is fitted with a structure by which the scarifier may be easily controlled. It is the principal object of the present invention therefore to provide a scarifier structure which may be connected with traction means at one end and which is provided with road wheels at the opposite end to adjustably support the frame of the machine, and to control the degree of penetration on the scarifier blades, all of which structure may be operated and controlled from a remote point on the traction means.

The present invention contemplates the provision of a main frame carrying a blade frame at the rear to which it is articulately connected and which main frame also carries road wheels adapted to be adjustably disposed with relation to the surface of the terrain over which the scarifier moves.

The invention is illustrated by way of example in the accompanying drawings in which:

Figure 1 is a view in plan showing the details of construction of the ripper as provided with a hydraulic control.

Fig. 2 is a view in side elevation showing the details of construction of the ripper shown in Fig. 1.

Fig. 3 is a view in transverse section as seen on the line 3—3 disclosing the pivotal mounting of the hydraulic control jack.

Fig. 4 is a view in side elevation showing a modified form of this structure controlled by mechanical means manually operated.

Referring more particularly to the drawings, 10 indicates the main frame of the structure which comprises a pair of parallel frame members 11 and 12 which extend rearwardly of the device and are secured together by a platform plate 13. The forward end of the platform plate is V-shaped and has downwardly extending side flanges 14 and 15 which terminate at an apex at the forward end of the frame. An end wall 16 connects the side flanges 14 and 15 and is formed with an opening 17 to receive the horizontally extending pin 18 of a draw bar hitch 19. This pin is provided with a shoulder 20 which abuts against the end face of the member 16 and a nut 21 which abuts against the rear face of a web 22. The web 22 is secured transversely between the flanges 14 and 15 and is provided with a central opening

23 through which the member 18 extends. Side rails 11 and 12 are shown in Fig. 3 as being of I beam section, and as shown in the plan view these beams extend rearwardly for a distance beyond the rear edge of the platform plate 13 of the frame. These extensions are provided to rigidly support a scarifier frame 24. The scarifier frame is here shown as formed with vertical end frame members 26 and 27 and vertical cross frame members 28 and 29 which members are connected with a platform plate 30 disposed thereabove. A similar plate 31 is disposed below the vertical frame members and carried thereby and is disposed parallel to the upper plate 30. A series of slotted openings 32 are formed through both plates and in staggered relation to each other as shown in Fig. 1. Mounted at opposite sides of the slotted openings in the upper plate 30 are angle plates 33 which have vertical flanges 34 extending parallel to each other and in alignment with the opposite sides of the slots 32. The slots 32 and the vertical flanges of the angle plates 33 are longitudinally aligned with relation to the structure and receive ripper teeth 35, which teeth extend downwardly through the frame structure 24 and are held against removal by bolts 36 and nuts 37. The teeth 35 are disposed at an angle to the vertical and are preferably inclined downwardly and forwardly from the frame 24. Each of the teeth passes through a guide stop 33' secured to the under face of the lower plate 31, and having front and rear shoulders tending to resist longitudinal movement of the teeth as would be the case when a scarifying action is taking place. The lower ends of the teeth extend forwardly in tapered toes 38 which are fitted to carry removable points 39 comprising a sleeve 40 into which the toe extends and a ripping blade 41 projecting forwardly of the sleeve and toe for cutting and penetrating the material to be acted upon. The frame structure thus assembled is pivotally mounted by ears 42 upon pivot pins 43 which carry fork structures 44 for ground wheels 45, one of which ground wheels is disposed at each side of the main frame 10 and in advance of the laterally projecting sides of the scarifying blade frame structure 24. The wheel forks 44 comprise parallel plates 46 and 47 which at their rear ends are pivoted upon the pins 43 and at the forward ends carry anti-friction bearing structures 48 to receive the axles 49 of the wheels 45.

It is intended that the wheels 45 shall be vertically adjustable with relation to the frame 10 and that they shall be simultaneously movable. This is accomplished by connecting the wheel

forks 44 by a rigid intermediate transverse yoke member 50. This member is preferably tubular in cross section and is welded with its ends abutting against the vertical faces of the plates 47.

5 A pair of levers 51 are secured upon the transverse yoke member 50 at a point intermediate the ends of the yoke and are spaced from each other to receive the forward end of a piston rod 52 which is connected to the levers by a pin 53.

10 In the form of the device shown in Figs. 1 and 2 of the drawings the piston rod 52 extends longitudinally of the frame 10 and forwardly of the ground wheels 45 where it carries a piston 54. This piston is adapted to reciprocate in the cylinder 55 of a hydraulic jack. The cylinder 55 is

15 fitted with a suitable head 56 through which the piston rod 52 extends. A suitable packing gland is carried by the cylinder head to prevent leakage therearound. The cylinder is provided at a point

20 midway its ends with a yoke 57 which carries oppositely extending trunnions 58 and 59. These trunnions are pivotally supported in a pair of vertically spaced brackets 60 and 61 secured to the platform plate 13 of the main frame 10 by

25 suitable means, such for example as the bolts 62. By this arrangement the cylinder may have free vertical swinging movement as necessary to adapt it to the various positions of the fork structures 44, as will be hereinafter set forth. Mounted at

30 opposite sides of the cylinder are fluid pipes 63 and 64. The pipe 63 extends from a point ahead of the trunnion 59 to a point beyond the end of the cylinder 55 where it communicates with the cylinder head 56. The pipe 64 is disposed upon

35 the opposite side of the cylinder 55 and extends at a point in the rear of the trunnion 58 to a point in advance of the dead end of the cylinder 55 where it communicates with the cylinder. The pipes 63 and 64 are secured to the ends of

40 the trunnions so that as the cylinder 55 rocks on the axis thereof the pipes will retain their fixed relation to the opposite ends of the cylinder. The two pipes 63 and 64 are provided for connection with a control valve 65 which is conveniently

45 disposed on traction means to which the draw bar hitch 19 is connected. Flexible hose lines 66 and 67 provide the connections between the pipes 63 and 64 and the valve member 65.

In the form of the invention shown in Fig. 4 of the drawings the wheel forks 44 are operated

50 by a cable 68 which is led from the traction unit to the transverse yoke member 50 of the forks and there passes around one of a pair of idler pulleys 69 after which it is led around idler pulleys 70 mounted upon a pivot pin 71 carried upon

55 brackets 60 and is then led around another of the pulleys 69 and finally anchored upon an anchor pin 72 carried on the bracket 60. In this way compounded leverage can be obtained by application of power to the cable 68 so that the wheel structures and their forks may be easily lifted. In both forms of the drawings it is desirable to provide means for maintaining the

60 wheels 45 substantially clean along their tread surfaces. As shown in Figs. 1 and 2 of the drawings this is accomplished by scraping blades 73 which are secured transversely of the fork structures 44 and fastened to the plates 46 and 47.

In operation of the present invention the structure is assembled as shown in Figs. 1 and 2, or

70 in Fig. 4, in either of which events the scarifier teeth 35 will be rigidly held in digging position with relation to the frame structure 24. The blades 41 are secured in place and the road wheels are moved downwardly to the position

indicated in dotted lines in Fig. 2 of the drawings, where it will be seen that the wheels 45 will lift the edges of the blades 41 a distance above the ground while bodily elevating the frame 10 at the rear thereof. It will be understood that the 5 draw bar hitch 19 is suitably connected to a traction unit and supports the forward end of the frame 10. When a scarifying action is to be performed the valve 65 is manipulated to allow fluid under pressure from a suitable pressure 10 source to pass through the line 67 to pipe 64 and to the forward end of the cylinder 55. This will force the piston 54 rearwardly exerting pressure against the lever arms 51 to elevate the yoke member 50 and to cause the wheel forks 44 15 to swing upwardly around the axis of the pivot pins 42. This operation will act to elevate the road wheels 45 to any desired controlled degree. It will be understood that as the wheels forks 44 swing upwardly it is necessary for the cylinder 20 55 of the hydraulic jack to maintain its aligned position between the axis of the trunnions 58 and 59 and the axis of the pivot pin 53. This is accommodated by the pivotal mounting of the cylinder 55 on the trunnions 58 and 59 which 25 are rotatably carried by the brackets 60 and 61. It will be evident that when the valve 65 is moved to a neutral position the piston 54 will be locked within the cylinder so that the wheels 45 will maintain a desired set position. This will 30 limit the degree of penetration of the ripper blades 41, or if desired will make it possible for the frame 10 to be supported entirely on the scarifier teeth 35 so that the blades 41 may penetrate the material being scarified to any uncon- 35 trolled depth. When it is desired to discontinue the operation of the machine fluid under pressure as controlled by valve 65 is delivered to the connection 66 and then through pipe 63 to the cylinder 55 at which time the piston 54 will move 40 forwardly within the cylinder swinging the road wheels 45 downwardly into contact with the road and thereafter producing a corresponding elevation of the scarifying teeth. In the form of the invention shown in Fig. 4 of the drawings 45 the operation will be identical with the exception that the cable 68 will be drawn to control the movement of the road wheels and thus the penetration of the scarifying blades 41.

Attention is directed to the fact that the ripper 50 teeth 35 are rigidly held in position by means which will resist considerable strain since the angle plates 33 and guide stops 33' have between them especially heat treated angle blocks which are welded into position and against which the 55 front and rear faces of the ripper teeth 35 will be forcefully held during their operation. This rigid holding of the ripper teeth is preferably brought about with the teeth in an inclined position, as shown in Figs. 2 and 3 of the drawings where it 60 will be seen that the forward ends of the teeth are in advanced positions with relation to their mountings upon the frame. This insures that to some extent the ripper teeth 35 will be held 65 downwardly into the earth through which they are passing. The action is further increased by the toes which comprise the sleeves 40 and the ripping blades 41. Attention is directed to the fact that the blades 41 are disposed on the upper face of the sleeves 40 and that there is an angular 70 clearance space 41' directly in the rear of the blade 41 and in advance of the end of the sleeve 40 which tends to cause the toes of the ripper teeth to be drawn downwardly into the soil and to be held in position at the depth of penetration as 75

controlled by the adjusted position of the ground wheels. An examination of Fig. 1 will also show that the two road wheel structures are quite rugged in their design, and are rigidly held together by the member 50 which is of great strength, thus insuring that the machine can be subjected to heavy duty without damaging strain.

It will thus be seen that the ripper here designed for performing scarifying operations is simple and quite rugged in construction so that it may be subjected to heavy duty without danger of damaging strains being imposed upon its parts, and that the machine is equipped with simple means whereby the operation of the machine may be remotely controlled by a structure not liable to get out of order.

While I have shown the preferred form of my invention, as now known to me, it will be understood that various changes might be made in the combination, construction, and arrangement of parts by those skilled in the art without departing from the spirit of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A scarifier of the type described comprising rigid parallel longitudinal extending frame members, said members being enclosed and secured together by horizontal platform plates, a transversely extending scarifier frame rigidly mounted across the rear ends of said parallel frame members, horizontal plates secured to and enclosing the transversely extending scarifier frame, slotted openings formed in the scarifier frame plates to accommodate a plurality of scarifier teeth, a plurality of scarifier teeth mountings in combination with the scarifier frame and its slotted openings, scarifier teeth extending through said slotted openings in the scarifier frame plates and one detachably secured in each of said mountings, said scarifier teeth being vertically mounted and inclined downwardly and forwardly, a pair of wheel forks one mounted on each side of the main frame in advance of the transversely extending scarifier frame, said mountings permitting vertical swinging movement of said forks

and remotely controlled means for simultaneously actuating the wheel forks to raise the wheels and to raise and lower the scarifier teeth from their operative positions, said means comprising a hydraulic jack to the opposite ends of which fluid pressure may be delivered alternately in swinging the wheel forks.

2. In a scarifier comprising a main frame composed of a pair of rigid parallel longitudinally extending frame members, said frame being enclosed and secured together by a pair of horizontal plates, a transversely extending scarifier frame rigidly mounted across the rear ends of said parallel frame members, horizontal plates secured to and enclosing the transversely extending scarifier frame, slotted openings formed in the scarifier frame plates to accommodate a plurality of scarifier teeth, a plurality of scarifier teeth mountings in combination with the scarifier frame and its slotted openings, said mountings being characterized as having a pair of angle plates fastened to the upper platform plate and parallel to the slotted openings formed in the platform plate of the scarifier frame, and angle members adapted to receive bolts whereby the scarifier teeth may be rigidly held in position with relation to the transversely extending scarifier frame, said scarifier teeth extending through said slotted openings in the scarifier frame plates one detachably secured in each of said mountings, said scarifier teeth being vertically mounted and inclined downwardly and forwardly, a pair of wheel forks one mounted on each side in the main frame in advance of the transversely extending scarifier frame, said mountings permitting vertical swinging movement of said forks, and remotely controlled means for simultaneously actuating the wheel forks to raise the wheels and to raise and lower the scarifier teeth from their operative positions, said means comprising a hydraulic jack to the opposite ends of which fluid pressure may be delivered alternately in swinging the wheel forks.

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